

# EXHIBIT 1

1 MICHAEL A. JACOBS (CA SBN 111664)  
MJacobs@mofo.com  
2 ARTURO J. GONZÁLEZ (CA SBN 121490)  
AGonzalez@mofo.com  
3 ERIC A. TATE (CA SBN 178719)  
ETate@mofo.com  
4 RUDY Y. KIM (CA SBN 199426)  
RKim@mofo.com  
5 MORRISON & FOERSTER LLP  
425 Market Street  
6 San Francisco, California 94105-2482  
Telephone: 415.268.7000  
7 Facsimile: 415.268.7522

8 KAREN L. DUNN (*Pro Hac Vice*)  
kdunn@bsflp.com  
9 HAMISH P.M. HUME (*Pro Hac Vice*)  
hhume@bsflp.com  
10 BOIES SCHILLER FLEXNER LLP  
1401 New York Avenue, N.W.  
11 Washington DC 20005  
Telephone: 202.237.2727  
12 Facsimile: 202.237.6131

13 Attorneys for Defendants  
UBER TECHNOLOGIES, INC.  
14 and OTTOMOTTO LLC

15 UNITED STATES DISTRICT COURT  
16 NORTHERN DISTRICT OF CALIFORNIA  
17 SAN FRANCISCO DIVISION

18 WAYMO LLC,  
19 Plaintiff,  
20 v.  
21 UBER TECHNOLOGIES, INC.,  
22 OTTOMOTTO LLC; OTTO TRUCKING LLC,  
23 Defendants.

Case No. 3:17-cv-00939-WHA

**UBER TECHNOLOGIES, INC. AND  
OTTOMOTTO LLC'S  
PRELIMINARY CLAIM  
CONSTRUCTIONS UNDER PATENT  
L.R. 4-2**

1 In accordance with Patent Local Rule 4-2(a), Uber Technologies, Inc. and Ottomotto LLC  
2 (collectively “Uber”) provide Plaintiff Waymo LLC (“Waymo”) with preliminary constructions  
3 for the terms proposed by Uber. Uber also identifies references from the specification or file  
4 history that support Uber’s proposed constructions, and designates supporting extrinsic evidence  
5 in Appendices A and B, as required by Patent Local Rule 4-2(b). Pursuant to Patent Rule 4-2(c),  
6 Uber is available to meet and confer for the purpose of narrowing claim construction issues.  
7

8 The charts below identify the proposed claim terms for construction, preliminary  
9 constructions, intrinsic evidence, and extrinsic evidence. The citations in the chart below are not  
10 limiting, and Uber reserves the right to refer to other evidence in its briefing and expert reports.  
11 For citations to intrinsic evidence, for example, Uber reserves the right to rely on portions of the  
12 specification identified by Waymo, other related portions of the specification not cited by the  
13 parties, figures referred to in citations to the written description by either party, portions of the  
14 written description referred to in figures cited by either party, related applications, and relevant  
15 prosecution history. For citations to extrinsic evidence, Uber reserves the right to rely on  
16 definitions in dictionaries used by Waymo and other dictionaries not identified by the parties.  
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## '922 and '464 Patents

#	Claim Term	Preliminary Construction	Intrinsic Evidence <sup>1</sup>	Extrinsic Evidence
1	<p>“wherein the housing is configured to rotate about an axis” (’922 patent, claim 1; ’464 patent, claim 1)</p> <p>***</p> <p>“rotating a housing of a light detection and ranging (LIDAR) device about an axis” (’922 patent, claim 15; ’464 patent, claim 16)</p>	<p>“wherein the housing is configured to rotate about an axis of the housing”</p> <p>***</p> <p>“rotating a housing of a light detection and ranging (LIDAR) device about an axis of the housing”</p>	<p>1:37-39, 1:60-62, 3:19-21, 3:29-33, 6:57-7:10, 11:24-26, 11:47-53, 13:48-62, 14:13-19, 16:60-17:9, 17:18-30, 17:49-54, 18:6-7, 18:24-27, Figs. 2, 3A, 8A, 8B, 9.</p>	<p>Dictionary definitions of “axis” in:</p> <ul style="list-style-type: none"> <li>• The Illustrated Dictionary of Electronics, Eighth Edition (“Illustrated Dictionary”) (Appendix A); and</li> <li>• Modern Dictionary of Electronics, Seventh Edition (“Modern Dictionary”) (Appendix B)</li> </ul> <p>Uber expects to provide expert testimony from Dr. Michael Lebby, Dr. Paul McManamon, or other experts regarding i) the state of the art of the ’922 and ’464 Patents, ii) the level of a person of ordinary skill in the art at the time of the ’922 and ’464 Patents, iii) disclosed embodiments in the ’922 and ’464 Patents, iv) how a person of ordinary skill would interpret the claim language in view of the intrinsic record of the ’922 and ’464 Patents, and v) opinions offered by any expert retained by Waymo.</p>

<sup>1</sup> The ’922 and ’464 Patents share a common specification. For simplicity, all citations to the specification in the intrinsic evidence column are to the ’922 Patent.

#	Claim Term	Preliminary Construction	Intrinsic Evidence <sup>1</sup>	Extrinsic Evidence
2	“transmit block” (’922 patent, claims 1, 15; ’464 patent, claims 1, 16)	“components, including light sources, that together at least generate light beams”	1:37-42, 1:62-67, 3:19-29, 3:34-51, 4:37-46, 5:1-30, 6:42-56, 7:11-49, 8:1-13, 9:15-34, 9:64-10:10, 10:62-67, 11:10-13, 11:47-53, 11:62-12:10, 14:21-26, 14:37-67, Figs. 1, 2, 3A, 3B, 4, 5A, 5B, 5C, 9.	Dictionary definitions of “block” and “light source” in the Illustrated Dictionary and Modern Dictionary.  Uber expects to provide expert testimony from Dr. Michael Lebby, Dr. Paul McManamon, or other experts regarding i) the state of the art of the ’922 and ’464 Patents, ii) the level of a person of ordinary skill in the art at the time of the ’922 and ’464 Patents, iii) disclosed embodiments in the ’922 and ’464 Patents, iv) how a person of ordinary skill would interpret the claim language in view of the intrinsic record of the ’922 and ’464 Patents, and v) opinions offered by any expert retained by Waymo.
3	“having a wavelength in a wavelength range” (’922 patent, claim 1; ’464 patent, claim 1)	Indefinite	4:16-25, 7:28-49, 9:45-50, 10:11-19, 11:62-12:10, 13:3-5, 15:19-31, Fig. 9.	Uber expects to provide expert testimony from Dr. Michael Lebby, Dr. Paul McManamon, or other experts regarding i) the state of the art of the ’922 and ’464 Patents, ii) the level of a person of ordinary skill in the art at the time of the ’922 and ’464 Patents, iii) disclosed embodiments in the ’922 and ’464 Patents, iv) how a person of

#	Claim Term	Preliminary Construction	Intrinsic Evidence <sup>1</sup>	Extrinsic Evidence
				ordinary skill would interpret the claim language in view of the intrinsic record of the '922 and '464 Patents, and v) opinions offered by any expert retained by Waymo.
4	“substantially vertical” (’922 patent, claim 9; ’464 patent, claim 10)	Indefinite	3:19-21, 6:57-7:3, 11:47-53, 13:48-62, 14:13-19, Fig. 2.	Uber expects to provide expert testimony from Dr. Michael Lebby, Dr. Paul McManamon, or other experts regarding i) the state of the art of the ’922 and ’464 Patents, ii) the level of a person of ordinary skill in the art at the time of the ’922 and ’464 Patents, iii) disclosed embodiments in the ’922 and ’464 Patents, iv) how a person of ordinary skill would interpret the claim language in view of the intrinsic record of the ’922 and ’464 Patents, and v) opinions offered by any expert retained by Waymo.

**'936 Patent**

#	Claim Term	Preliminary Construction	Intrinsic Evidence	Extrinsic Evidence
5	"diode" ( '936 patent, claims 1, 9, 17)	"a two terminal semiconductor device with an anode and a cathode that allows the flow of current in one direction only"	18:29-40, 18:58-67, 19:28-30, Figs 5a, 5b, 5c, 5e, 6b, 6c.	Dictionary definitions of "diode" in the Illustrated Dictionary and Modern Dictionary.  Uber expects to provide expert testimony from Dr. Michael Lebby or other experts regarding i) the state of the art of the '936 Patent, ii) the level of a person of ordinary skill in the art at the time of the '936 Patent, iii) disclosed embodiments in the '936 Patent, iv) how a person of ordinary skill would interpret the claim language in view of the intrinsic record of the '936 Patent, and v) opinions offered by any expert retained by Waymo.
6	"charging path" ( '936 Patent, claims 1, 9, 17).	"a path allowing current to flow from the inductor to the capacitor, the path configured to charge the capacitor to a voltage higher than the supply voltage"	18:31-44, 18:44-67, 19:25-31, 20:35-41, 20:46-49, 21:40-41, 26:54-27:3, Figs 5a, 5b, 5c, 5e, 6b, 6c.	Uber expects to provide expert testimony from Dr. Michael Lebby or other experts regarding i) the state of the art of the '936 Patent, ii) the level of a person of ordinary skill in the art at the time of the '936 Patent, iii) disclosed embodiments in the '936 Patent, iv) how a person of ordinary skill would interpret the claim language in view of the intrinsic record of the '936 Patent, and v) opinions offered by any

#	Claim Term	Preliminary Construction	Intrinsic Evidence	Extrinsic Evidence
				expert retained by Waymo.
7	“wherein the capacitor is charged immediately following emission of a pulse of light from the light emitting element” (’936 patent, claims 3, 11, 19).	Indefinite	Fig. 5b, 21:53-22:12.	Uber expects to provide expert testimony from Dr. Michael Lebby or other experts regarding i) the state of the art of the ’936 Patent, ii) the level of a person of ordinary skill in the art at the time of the ’936 Patent, iii) disclosed embodiments in the ’936 Patent, iv) how a person of ordinary skill would interpret the claim language in view of the intrinsic record of the ’936 Patent, and v) opinions offered by any expert retained by Waymo.

Uber bases these constructions upon its current knowledge, understanding, and belief as to the facts and information available as of this date. Uber has not yet completed its investigation, collection of information, or discovery relating to this action, and expressly reserve the right to supplement, amend, and/or otherwise modify these preliminary claim constructions. Uber also reserves the right to modify and amend the constructions and to supplement the intrinsic and extrinsic evidence supporting the constructions in light of Waymo’s constructions and cited evidence, the meet-and-confer process, or fact or expert discovery. In addition to evidence cited here, Uber relies on the claim language itself and may rely on expert testimony or declaration, deposition testimony, or other documents produced in this case.



1 Dated: June 19, 2017

MORRISON & FOERSTER LLP

2 By: /s/ Michael A. Jacobs

3 MICHAEL A. JACOBS

4 Attorneys for Defendants  
5 UBER TECHNOLOGIES, INC. and OTTOMOTTO  
6 LLC  
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# **APPENDIX A**

# **The Illustrated Dictionary of Electronics**

Eighth Edition

*Stan Gibilisco*  
*Editor-in-Chief*

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**axial leads** The centrally located leads emanating from the ends of cylindrical components, such as resistors and diodes.

**axial ratio** The ratio of the minor to major axes of a waveguide's polarization ellipse.

**axis 1.** A coordinate in a graphical presentation or display (e.g., horizontal and vertical axes in a rectangular coordinate system). **2.** The real or imaginary straight line around which a body rotates, or the line that passes through the center of a symmetrical arrangement (line of symmetry).

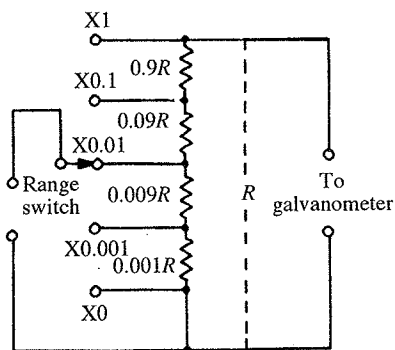
**axis of abscissas** The horizontal axis (x-axis) of a rectangular-coordinate graph or screen. Compare **AXIS OF ORDINATES**.

**axis of imaginaries** The vertical axis of the complex plane in which rectangular vectors lie. Compare **AXIS OF REALS**.

**axis of ordinates** The vertical (y-axis) of a rectangular-coordinate graph or screen. Compare **AXIS OF ABSCISSAS**.

**axis of reals** The horizontal axis of the complex plane in which rectangular vectors lie. Compare **AXIS OF IMAGINARIES**.

**Ayrton-Mather galvanometer shunt** A step-adjustable universal shunt resistor for varying the sensitivity of a galvanometer. It has the virtue of keeping the galvanometer critically damped. The shunt is also useful in multirange milliammeters, microammeters, and ammeters. The sensitive meter movement is never without a shunting resistor during range switching.

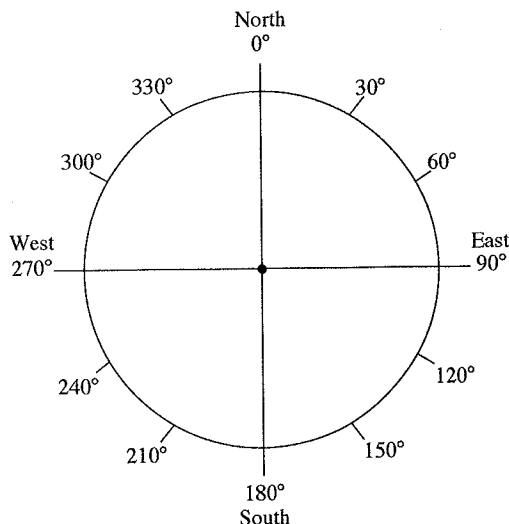


**Ayrton-Mather galvanometer shunt**

**Ayrton-Perry winding** A noninductive winding comprising two inductors conducting current in opposite directions; the opposing flow cancels the magnetic field.

**azel display** A plan-position display that incorporates two different radar traces on a single cathode-ray tube (CRT), one giving bearing, the other elevation.

**azimuth** Also called *compass direction*. Angular measurement in the horizontal plane, clockwise from north. It is important in radio and television communications, navigation, direction finding, land surveying, and radar.



**azimuth**

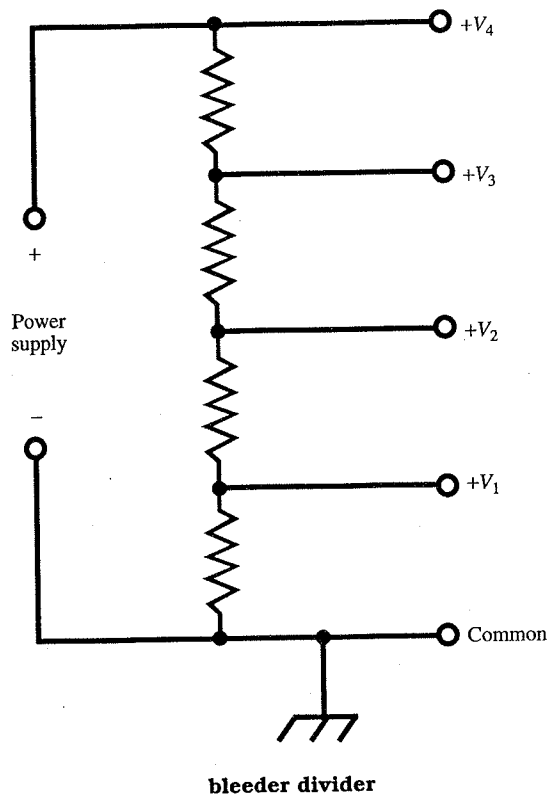
**azimuth alignment** In a tape recorder, the alignment of record and playback head gaps so that their centerlines are parallel.

**azimuth blanking** In a radar system, blacking-out of the image as the antenna sweeps across a specified range of azimuth angles. Effectively eliminates nuisance echoes from stationary, permanent objects (such as tall buildings or communications towers).

**azimuth resolution** In a radar system, the minimum azimuth separation of two targets whose range (distance from the station) are equal that is required for the system to show two echoes, rather than one. It is generally measured in degrees.

**azusa** An electronic tracking system, in which a single station provides slant range and two direction cosines for a distant airborne object. This accurately defines the coordinates of the distant object in three-dimensional space.

## 78 bleeder temperature • blocking interference



**bleeder temperature** The operating temperature in a bleeder. It is generally high because of power dissipation in the form of heat.

**bleeding whites** A flowing of the white areas of a television picture into the black areas; an overload condition.

**blemish** See BURN.

**blind flight** The flying of aircraft entirely by means of instruments and electronic communications.

**blind landing** Landing of an aircraft entirely by means of instruments and electronic communications.

**blind zone** 1. In radar operations, an area that gives no echoes. 2. Skip zone (see ZONE OF SILENCE).

**blip** 1. The pulse-like figure on a radar scan, indicating the transmission or reflection (see A-SCAN and J-SCAN). Also called PIP. 2. In visual alignment of a tuned circuit using a sweep generator and marker generator, the pulse or dot produced on the response curve by the marker signal. 3. A short, momentary signal pulse, such as a single Morse dot.

**BLIP** Abbreviation for *background-limited infrared photoconductor*.

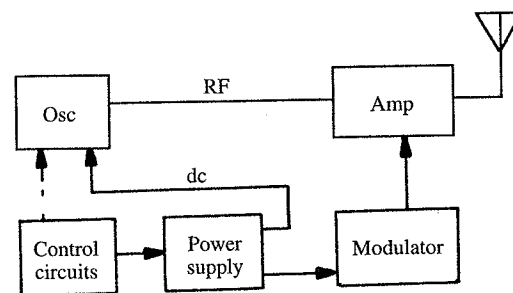
**blip-scan ratio** The number of radar scans necessary to show a visible blip, or echo, on a radar screen.

**Block functions** Solutions of the *Schrodinger wave equation* for a single electron surrounded by an electric field. The field varies periodically with distance from the source.

**Block wall** The transition layer between adjacent ferromagnetic domains (see DOMAIN).

**block** 1. A group of data words or digits. 2. A group of memory storage spaces. 3. A circuit that operates as an identifiable unit. 4. The symbol for a circuit, stage, unit, or device in a BLOCK DIAGRAM.

**block diagram** A simplified diagram of an electronic system, in which circuits, stages, units, or devices are shown as two-dimensional boxes with the internal wiring and detail circuitry omitted. This makes it possible to clearly show the interconnection among circuits, stages, units or devices. It also provides a concise rendition of the overall functional concept of the system.



**block diagram**  
(of a radio transmitter)

**blocked impedance** The input impedance of a transducer, whose output load is a theoretically infinite impedance.

**blockette** In a computer, the subdivision of a character block that is handled as a unit during data transfer.

**blocking action** Obstruction of circuit action, usually abrupt, through internal action or by the application of an external signal. Thus, the operation of an amplifier can be blocked (output reduced to zero) by an input signal or by excessive feedback, either of which overloads the input.

**blocking capacitor** A capacitor inserted into a circuit to prevent the passage of direct current while easily passing alternating current.

**blocking choke** Any inductor, such as a choke coil, that is used to prevent the flow of an alternating current while allowing direct current to pass with little resistance.

**blocking interference** Radio interference from signals strong enough to reduce the receiver output through blocking action.

**digit filter** A device for detecting designations. See DESIGNATION.

**digitize** 1. To express the results of an analog measurement in digital units. 2. To convert an analog signal into corresponding digital pulses.

**digitizer** See ANALOG-TO-DIGITAL CONVERTER.

**digit period** In a digital circuit or system, the time interval between the start of one digital pulse and the start of the next pulse.

**digit place** See DIGIT POSITION.

**digit plane** In a matrix-type computer memory, the plane within a three-dimensional array of memory storage elements representing a DIGIT POSITION.

**digit position** The ordinal position of a digit in a numeral, the first position being occupied by the least-significant digit (e.g., 7 is in the third position in the numeral 756).

**digit pulse** A pulse that energizes magnetic core memory elements representing a digit position in several words.

**digitron** A display in which all of the characters lie in a single, flat plane.

**digit time** The duration of a digit signal in a series of signals.

**digit time slot** In digital communications, the interval of time assigned to one bit or one digit.

**digit-transfer bus** In a digital computer, a main line (of conductors) that transfers information among various registers; it does not handle control signals.

**diheptal CRT base** The 14-pin base of a cathode-ray tube. Also see BIDEAL, DUODECAL, and MAGNAL.

**DIIC** Abbreviation for *dielectric-isolated integrated circuit*. Several separate integrated-circuit wafers are contained in a single package, and kept electrically insulated by layers of dielectric.

**dilatometer** An instrument used to measure expansion.

**dimension** 1. Any measurable quantity, such as distance, time, temperature, humidity, etc. 2. An axis in the three-dimensional Cartesian coordinate system. 3. An independent variable in a function of one or more variables.

**dimensional analysis** A mathematical procedure whereby an equation involving quantities with different units is verified as being *dimensionally correct*. The original variables are replaced with fundamental quantities, such as resistance ( $R$ ), current ( $I$ ), length or displacement ( $d$ ), and time ( $t$ ), applicable to electrical systems. The equation is dimensionally correct if it can be shown that the left and right sides of the equation are identical.

**dimensional ratio** In magnetism, the ratio of the longest diameter of an elongated ellipsoid of revolution to the shortest.

**dimensional stability** Nonvariance or little variance in the shape and size of a medium (such as film) during the processing of that material.

**digit filter • diode-capacitor memory cell 191**

**dimensionless quantity** A quantity that is merely a real number. Example: logarithm, exponent, numerical ratio, etc. In contrast are physical quantities: 3 volts, 5000 hertz, 10 amperes, etc.

**diminished radix complement** See COMPLEMENT.

**dimmer** An electronic device used for controlling the brightness of incandescent lamps. Using amplified control, the device enables high-wattage lamp loads to be smoothly adjusted via a small rheostat or potentiometer. A photoelectric-type dimmer automatically controls lamps in accordance with the amount of daylight.

**dimmer curve** The function of a light-dimmer voltage output as a function of setting on a linear scale.

**DIN** Abbreviation for *Deutsche Industrie Normenausschuss*. A German association that sets standards for the manufacture and performance of electrical and electronic equipment, as well as other devices.

**D indicator** In radar operations, an indicator combining type B and C indicators (see B DISPLAY and C DISPLAY).

**Dingley induction-type landing system** An aircraft landing system that provides lateral and vertical guidance; instead of radio, it uses the magnetic field surrounding two horizontal cables laid on or under either side of the runway.

**diode** A two-element device containing an anode and a cathode, and providing unidirectional conduction. The many types are used in such devices as rectifiers, detectors, peak clippers, mixers, modulators, amplifiers, oscillators, and test instruments.

**diode action** 1. The characteristic behavior of a diode (i.e., rectification and unidirectional conduction). 2. Two-electrode rectification or unidirectional conductivity in any device other than a diode (e.g., asymmetrical conductivity between the collector and base of a transistor).

**diode amplifier** 1. A parametric amplifier employing a varactor. 2. An amplifier utilizing hole-storage effects in a semiconductor diode. 3. A negative-resistance amplifier using a tunnel diode.

**diode array** A combination of several diodes in a single housing.

**diode assembly** See DIODE ARRAY.

**diode bias** A steady direct-current (dc) voltage applied to a diode to establish its operating point.

**diode capacitance** The capacitance existing at the p-n junction of a semiconductor diode when the junction is reverse-biased. The capacitance generally varies, depending on the reverse-bias voltage.

**diode capacitor** 1. A capacitor normally operated with a diode. 2. A voltage-variable capacitor utilizing the junction capacitance of a semiconductor diode (e.g., a varactor).

**diode-capacitor memory cell** A high-value capacitor in series with a high-back-resistance semi-



## 408 light sensor • linear algebra

phototube. **2.** A light-sensitive substance, such as cesium, selenium, silicon, cadmium selenide, or lead sulfide.

**light source** Any generator of light. Under some conditions, the source is regarded as a point.

**light spectrum** See ELECTROMAGNETIC THEORY OF LIGHT.

**light-spot scanner** Also called *flying-spot scanner*. A television camera using (as a source of illumination) a spot of light that scans what is to be televised.

**light transmitter** See LIGHT-BEAM TRANSMITTER.

**light valve** **1.** An electromechanical device for varying the intensity of light passing through its adjustable aperture. **2.** See KERR CELL.

**light-wave telephony** Telephone communication by means of modulated-light transmission, usually through an OPTICAL FIBER.

**light-year** Abbreviation, lt.-yr. Pertaining to astronomy, a unit of distance equal to the distance traveled by light in one year in a vacuum:  $9.460\,55 \times 10^{15}$  meters ( $5.878 \times 10^{12}$  miles).

**likelihood** In probability and statistics, the chance that an event will occur or that an outcome will be realized. Also see PROBABILITY, **1**, **2**.

**lim** Abbreviation of LIMIT.

**Lima** Pronunciation, *LEE-ma*. Phonetic alphabet word for the letter L.

**limen** A unit that has been proposed as the minimum audible change in frequency that can be detected by at least half of a group of listeners.

**limit** **1.** The lowest or highest frequency in a band. **2.** In mathematics, a fixed value that a variable approaches. **3.** The upper and lower extremes in any performance range or value range.

**limit bridge** A bridge used to check a component (e.g., resistance, capacitance, or inductance) in terms of the tolerance limits, rather than the nominal (named) value, of that component. Also see BRIDGE, **2**.

**limited integrator** A circuit that integrates two input signals until the corresponding output signal exceeds a certain limit.

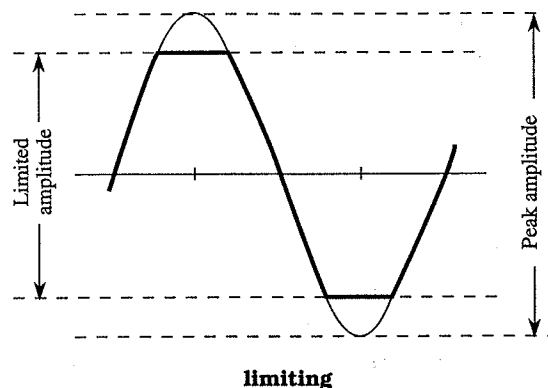
**limited stability** A characteristic of a circuit or system, allowing proper operation only if the input signal and applied voltages are within certain maximum and minimum limits.

**limiter** A device or circuit whose output-signal amplitude remains at some predetermined level, despite wide variations in input-signal amplitude.

**limiting** The restriction of the maximum peak amplitude of a signal to a designated level.

**limiting amplifier** An amplifier that automatically holds the output-signal level to a prescribed value.

**limiting current** In electrolysis, the highest current that conducts under certain conditions of ion concentration. This current depends on the electrolyte material, the concentration of the electrolyte in solution, the electrode substance, and the size of the electrolytic cell.



**limiting error** The anticipated maximum value of the absolute error in a computation.

**limiting resistor** See CURRENT-LIMITING RESISTOR.

**limiting resolution** As a measure of video image resolution, the maximum number of lines for picture height that can be discriminated on a test chart.

**limit switch** A switch that is actuated when a monitored quantity (e.g., current, voltage, or illumination) reaches the limit of its range.

**line** **1.** A wire, cable, or waveguide, along which electrical or electromagnetic energy travels from one defined place to another. **2.** One lengthwise path in which a force, such as electricity or magnetism, is evidenced. Such a *line of flux* has theoretically zero width.

**line advance** **1.** The physical separation between the centers of adjacent scanning lines in a television system. **2.** Line feed in a text data transmission system.

**line amplifier** An amplifier in a telephone line or similar channel, or one feeding such a line from the input end.

**linear** **1.** In a straight line. **2.** In the manner of a straight line. Thus, linear response is indicated when one quantity varies directly with another; the graph of this response is a straight line (i.e., one of constant slope). **3.** The characteristic of a signal that is a replica of another (e.g., an amplifier output signal of the same waveform as that of the input signal).

**linear absorption coefficient** A number expressing the extent to which the intensity of an X-ray beam is reduced per centimeter of the material through which it passes.

**linear accelerator** A device in which subatomic particles are accelerated in a straight line through a long tube. This action is in contrast with that occurring in a circular accelerator, such as a CYCLOTRON.

**linear algebra** A branch of mathematics that deals with the solving of linear equations or sets of linear equations.



## **APPENDIX B**

**MODERN  
DICTIONARY  
of  
ELECTRONICS**

SEVENTH EDITION

REVISED AND UPDATED


**Rudolf F. Graf**



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**avalanche photodiode — azimuth**

generated in a junction diode operated at the point at which avalanche just begins.

**avalanche photodiode**—1. A photodiode that takes advantage of the avalanche multiplication of photocurrent. It is particularly suited to low-noise and/or high-speed applications. 2. A device that utilizes avalanche multiplication of photocurrent by means of hole electrons created by absorbed photons. When the device's reverse-bias voltage nears breakdown level, the hole-electron pairs collide with substrate atoms to produce multiple hole-electron pairs.

**avalanche transistor**—A transistor that, when operated at a high reverse-bias voltage, supplies a chain generation of electron-hole pairs.

**avalanche voltage**—The applied voltage at which avalanche breakdown occurs.

**avalanching**—A process resulting from high fields in a semiconductor device, in which an electron is accelerated by the field, hits an atom, and releases more electrons, which continue the sequence.

**AVC**—See automatic volume control.

**average**—See arithmetic mean.

**average absolute pulse amplitude**—The average of the absolute value of instantaneous amplitude taken over the pulse duration. Absolute value means the arithmetic value regardless of algebraic sign.

**average brightness**—The average illumination in a television picture.

**average calculation operation**—A typical computer calculating operation longer than an addition and shorter than a multiplication, often taken as the mean of nine additions and one multiplication.

**average current**—The arithmetic mean of the instantaneous currents of a complex wave, averaged over one half cycle.

**average electrode current**—The value obtained by integrating the instantaneous electrode current over an averaging time and dividing by the average time.

**average life**—See mean life, 1.

**average noise factor**—See average noise figure.

**average noise figure**—Also called average noise factor. In a transducer, the ratio of total output noise power to the portion attributable to thermal noise in the input termination, with the total noise being summed over frequencies from zero to infinity and the noise temperature of the input termination being standard (290 K).

**average outgoing quality**—The ultimate average quality of products shipped to the customer that results from composite sampling and screening techniques.

**average power output of an amplitude-modulated transmitter**—The radio-frequency power delivered to the transmitter output terminals, averaged over a modulation cycle.

**average pulse amplitude**—The average of the instantaneous amplitudes taken over the pulse duration.

**average rate of transmission**—Effective speed of transmission.

**average value**—1. The value obtained by dividing the sum of a number of quantities by the number of quantities. The average value of a sine wave is 0.637 times the peak value. 2. The dc voltage of current amplitude that will transfer the same electrical charge to a capacitor as the ac waveform during a half period. Mathematically, it is the average of the absolute value of all the instantaneous amplitudes.

**average voltage**—The sum of the instantaneous voltages in a half-cycle waveshape, divided by the number of instantaneous voltages. In a sine wave, the average voltage is equal to 0.637 times the peak voltage.

**aviation channels**—A band of frequencies, below and above the standard broadcast band, assigned exclusively for aircraft and aviation applications.

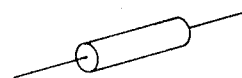
**aviation services**—The aeronautical mobile and radionavigational services.

**avionics**—1. An acronym designating the field of aviation electronics. 2. The branch of electronics that is concerned with aviation applications. 3. The design, production, and application of electronic devices and systems for use in aviation and astronautics.

**Avogadro's number**—The actual number of molecules in one gram-molecule, or of atoms in one gram-atom, of an element or any pure substance ( $6.023 \times 10^{23}$  molecules/mole).

**AWG**—1. American wire gage. A means of specifying wire diameter. The higher the number, the smaller the diameter. 2. A scale of gage sizes which, with the exception of the largest sizes, 4/0 through 1/0, increases with the descending values of wire diameter. For example, a 1 AWG wire has a diameter of 0.289 inch (7.34 mm) and a wire of 40 AWG has a diameter of 0.0031 inch (78.74  $\mu$ m). AWG is applied to stranded as well as solid conductors.

**axial leads**—Leads coming out the ends and along the axes of a resistor, capacitor, or other axial part, rather than out the side.



*Axial leads.*

**axial ratio**—Ratio of the major axis to the minor axis of the polarization ellipse of a waveguide. This term is preferred over *ellipticity* because, mathematically, ellipticity is 1 minus the reciprocal of the axial ratio.

**axis**—The straight line, either real or imaginary, passing through a body around which the body revolves or around which parts of a body are symmetrically arranged.

**Ayrton-Perry winding**—1. Two conductors connected in parallel so that the current flows in opposite directions in each conductor and thus neutralizes the inductance between the two. 2. A noninductive winding with two inductors that conduct current in opposite directions, with the opposing currents canceling the magnetic field.

**Ayrton shunt**—Also called universal shunt. A high-resistance parallel connection used to increase the range of a galvanometer without changing the damping.

**azel display**—A modified type of plan-position indicator presentation showing two separate radar displays on one cathode-ray screen. One display presents bearing information, and the other shows elevation.

**az-el mount**—An antenna mount that tracks satellites by moving in two directions: the azimuth in the horizontal plane, and elevation up from the horizon.

**azimuth**—1. The angular measurement in a horizontal plane and in a clockwise direction. 2. In a tape recorder, the angle that recording and playback head gaps make with the line along which the tape moves. The head is oriented until this angle is 90°. 3. The vertical setting (alignment) of the head in a tape recorder. 4. Compass direction from due north measured in degrees clockwise. (True north can be found by sighting the star Polaris at

**blanking level — block**

**blanking level**—Also called pedestal level. 1. In a composite picture signal, the level that separates the range of the composite picture signal containing picture information from the range containing synchronizing information. 2. Usually referred to as the front porch or back porch. At 0 IRE units, it is the level that will shut off the picture tube, resulting in the blackest possible picture.

**blanking pulse**—A square wave (positive or negative) used to switch off electronically a part of a television or radar set for a predetermined length of time.

**blanking signal**—A wave made up of recurrent pulses related in time to the scanning process and used to effect blanking. In television, this signal is composed of pulses at line and field frequencies, which usually originate in a central sync generator and are combined with the picture signal at the pickup equipment in order to form the blanked picture signal. The addition of a sync signal completes the composite picture signal.

**blanking time**—The length of time the electron beam of a cathode-ray tube is cut off.

**blanking zone**—See blanking pulse.

**blank instruction**—See no-operation instruction.

**blank record**—A recording disk on which no material has been recorded.

**blank tape**—Also called raw tape or virgin tape. 1. Tape on which nothing has been recorded. 2. Magnetic tape that has never been subjected to the recording process and is therefore substantially free from noise.

**blast filter**—Also called a pop filter. A dense mesh screen on a microphone, which minimizes overload caused by loud, close sounds.

**blasting**—1. Overloading of an amplifier or speaker, resulting in severe distortion of loud sounds. 2. Severe audible distortion due to overloading of sound-reproducing equipment.

**bleeder**—A resistor connected across a power source to improve voltage regulation, provide a current path under no-load conditions, or dissipate stored energy on shut-off.

**bleeder current**—The current drawn continuously from a power supply by a resistor. Used to improve the voltage regulation of the power supply. (A technology no longer in use.)

**bleeder resistor**—1. A resistor used to draw a fixed current. Also used, as a safety measure, to discharge a filter capacitor after the circuit is deenergized. 2. A resistor placed in the power supply of a radio receiver or other electronic device to stabilize the voltage supply.

**bleeding**—1. Migration of plasticizers, waxes, or similar materials to the surface to form a film or bead. 2. In photomasking, poor edge definition or acuity caused by spread of image onto adjacent areas. 3. A condition in which a plated hole discharges process material or solution from crevices or voids. 5. During hybrid circuit manufacturing, the lateral spreading or diffusion of a printed film into adjacent areas beyond the geometric dimensions of the printing screen. This may occur during drying or firing.

**bleeding whites**—An overloading condition in which white areas in a television picture appear to flow into the black areas.

**bleedout**—The tendency of absorbed electrolytes, impurities, base materials, and preplates to diffuse to the surface of gold plating.

**blemish**—1. On the storage surface of a charge-storage tube, an imperfection that produces a spurious output. 2. An area in a fiber or fiber bundle that has a reduced light transmission capability, i.e., increased attenuation, due to defective or broken fibers, foreign substances, or other spoilage.

**blended data**—Q-point that results from the combination of scanning data and tracking data to form a vector.

**blending**—A means of obtaining intermediate viscosities from materials of the same type but different viscosities. This term is also applied to resistive inks that can be blended with each other to achieve intermediate resistivities.

**blind approach**—An aircraft landing approach when visibility is poor, usually made with the aid of instruments and radiocommunication.

**blind approach beacon system**—See BABS

**blind landing**—Landing an aircraft entirely by means of instruments and electronic communications.

**blind zone**—An area from which echoes cannot be received; generally, an area shielded from the transmitter by some natural obstruction and therefore from which there can be no return.

**blinking**—1. An ECM technique by which two aircraft separated a short distance and within the same azimuth resolution appear as one target to a tracking radar. The two aircraft alternately spot jam, causing the radar system to oscillate from one target to the other and making it impossible to obtain an accurate solution of the fire-control problem. 2. In pulse systems, a method of providing information in which the signal is modified at its source so that the presentation on the display scope alternately appears and disappears. In loran, this indicates that a station is malfunctioning.

**blip**—Sometimes referred to as pip. 1. On a cathode-ray display, a spot of light or a base-line irregularity representing the radar reflection from an object. 2. A discontinuity in the insulation of a wire.

**blip-frame ratio**—The ratio of the number of computer frames during which radar data was obtained to the total number of computer frames.

**blip-scan ratio**—The ratio between a single recognizable blip on a radarscope and the number of scans necessary to produce it. The blip-scan ratio of any given radar set varies with the range, antenna tilt, level of operator and set performance, target aspect, wind, etc.

**blister**—1. The enclosure housing an airborne radar antenna. 2. A lump or raised section of a conductor or resistor caused by outgassing of the binder or vehicle during firing.

**blistering**—The development, during firing, of enclosed or broken macroscopic vesicles or bubbles in a body or in a glaze or other coating.

**blivet**—An excess of coating material, such as a lump around a dust particle on a wire or a surface. See also land, 2.

**Bloch wall**—The transition layer separating adjacent ferromagnetic domains.

**block**—1. A group of computer words considered as a unit because they are in successive storage locations. 2. The set of locations or tape positions in which a block of words is stored. 3. A circuit assemblage that functions as a unit, such as a circuit building block of standard design or the logic block in a sequential circuit. 4. A set of contiguous bits and/or bytes that make up a definable quantity of information. 5. A section of information recorded on magnetic tape or disk. One block may consist of several records, that is, collections of information consisting of one or more related items; or a record may extend over several blocks, depending on the characteristics of the device and the needs of the programmer. 6. A group of consecutive words, characters, or bits that is handled as a single unit, particularly with respect to input/output operations. 7. A group of characters that is written or read as a physical unit as distinct from a logical unit (see record). A block may contain one or more



complete records, or part of a record. 8. A string of data elements that is recorded or transmitted as a unit. 9. In word processing, a selected section of characters. In data management, a group of records. In communications, a fixed batch of data that is transferred together.

**block address**—A method of identifying words through use of an address that specifies the format and meaning of the words in the block of information.

**block cancel character**—A character used to signify that the preceding portion of the block is to be disregarded. Also called block ignore character.

**block code**—A special code or character used to separate blocks of data. A block code is used typically on paper tape and generally occurs at both the beginning and end of a block. Thus, the information on a paper tape containing a number of blocks would be started by a block code, there would be a block code between adjacent blocks, and the data would be ended by a block code.

**block diagram**—1. A diagram in which the essential systems units are drawn as blocks, and their relationship to each other is indicated by appropriately connected lines. The path of the signal or energy may be indicated by lines or arrows. 2. In computer programming, a graphical representation of the data-processing procedures within the system. It is used by programmers as an aid to program development. 3. A diagram in which a system or computer program is represented by annotated boxes and interconnecting lines. Synonym: flowchart. 4. A chart that graphically depicts the functional relationships of hardware making up a system. The block diagram serves to indicate the various data and control signal paths between functional units of the system hardware. 5. A drawing in which circuit functions are represented as blocks of various geometries.

**block downconversion**—The process of lowering an entire band of frequencies in one step to some intermediate range to be processed by a receiver. Multiple block downconversion receivers are capable of independently selecting channels because each can process the entire block of signals.

**block downconverter**—1. A device that converts an entire band (e.g., the 3.7–4.2 GHz C-band) down to a lower band of frequencies. 2. A type of downconverter that changes the microwave signal into an IF frequency that contains all the transponder frequencies (channels) of the satellite. The block downconverter allows inexpensive multiple receivers to tune all the channels simultaneously using one central downconverter—an advantage when using multiple receivers with a single antenna.

**blocked impedance**—The input impedance of a transducer when its output is connected to a load of infinite impedance.

## block address — blocking oscillator

**blocked resistance**—Resistance of an audio-frequency transducer when its moving elements are restrained so they cannot move; it represents the resistance due only to electrical loss.

**blockette**—In digital computer programming, a subgroup, or subdivision, of a group of consecutive machine words transferred as a unit.

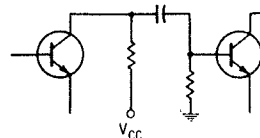
**block gap**—1. An area used to indicate the end of a block or record on a data medium. 2. An absence of data along a specified length of magnetic tape between adjacent blocks of data.

**block-grid keying**—A method of keying a continuous-wave transmitter by operating the amplifier stage as an electronic switch. During the spacing interval when the key is open, the bias on the control grid becomes highly negative and prevents the flow of plate current so that the tube has no output. During the marking interval when the key is closed, this bias is removed and full plate current flows.

**block ignore character**—See block cancel character.

**blocking**—1. Application of an extremely high-bias voltage to a transistor, vacuum tube, or metallic rectifier to prevent current from flowing in the forward direction. 2. Combining two or more records into one block. 3. A condition in a switching system in which no paths or circuits are available to complete a call, resulting in a busy tone returned to the calling party. A denial or busy condition.

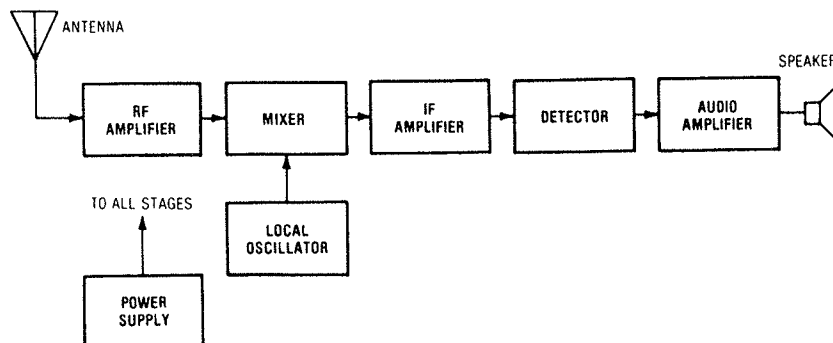
**blocking capacitor**—1. A capacitor that introduces a comparatively high series impedance for limiting the flow of low-frequency alternating and direct current without materially affecting the flow of high-frequency alternating current. 2. A capacitor used to block direct current while allowing an alternating current of certain frequencies to pass.



Blocking capacitor.

**blocking layer**—See depletion layer.

**blocking oscillator**—Also called squegging oscillator. 1. An electron-tube oscillator that operates intermittently as its grid bias increases during oscillation to a point



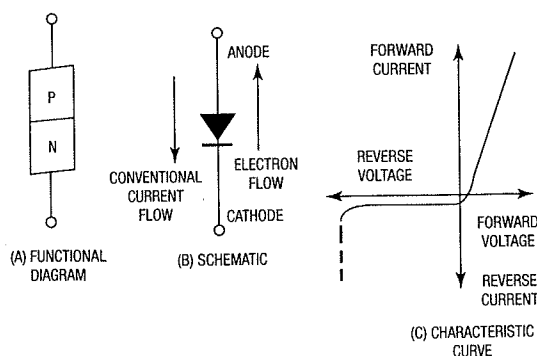
Block diagram, 1.

**DIN jack — dip**

elevation angle as the vertical coordinate. Each horizontal trace is expanded vertically by a compressed time sweep to facilitate separation of the signal from noise and to give a rough range indication.

**DIN jack**—A system of multipin jacks and plugs allowing several connections to be made at once. Named after the German Institute for Standards (DIN).

**diode**—1. An electron tube having two electrodes: a cathode and an anode. 2. *See* crystal diode. 3. A two-element electron tube or solid-state device. Solid-state diodes are usually made of either germanium or silicon and are primarily used for switching purposes, although they can also be used for rectification. Diodes are usually rated at less than one-half ampere. 4. A two-terminal electronic device that will conduct electricity much more easily in one direction than in the other. 5. A semiconductor device with two terminals and a single junction, exhibiting varying conduction properties depending on the polarity of the applied voltage. 6. A two-terminal semiconductor device exhibiting a nonlinear voltage-current characteristic; it has the asymmetrical voltage-current characteristic exemplified by a single pn junction.

**Diode.**

**diode amplifier**—A parametric amplifier that uses a special diode in a cavity. Used to amplify signals at frequencies as high as 6000 MHz.

**diode assembly**—A single structure of more than one diode.

**diode characteristic**—The composite electrode characteristic of a multielectrode tube, taken with all electrodes except the cathode connected together.

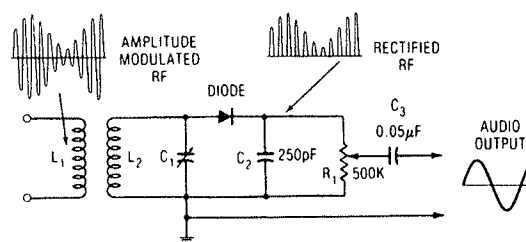
**diode demodulator**—Also called diode detector. A demodulator in which one or more semiconductor or electron-tube diodes are used to provide a rectified output that has an average value proportional to the original modulation.

**diode detector**—*See* diode demodulator.

**diode gate**—An AND gate that uses diodes as switching elements.

**diode isolation**—A method in which a high electrical resistance between an IC element and the substrate is obtained by surrounding the element with a reverse-biased pn junction.

**diode laser**—Also called laser diode, injected laser, coherent electroluminescence device, semiconductor laser. A pn junction semiconductor electron device that converts direct forward-bias electrical input (pump power) directly into coherent optical output power via a process of stimulated emission in the region near the junction.

**Diode detector.**

**diode limiter**—A circuit employing a diode and used to prevent signal peaks from exceeding a predetermined value.

**diode logic**—An electronic circuit using current-steering diodes in an arrangement such that the input and output voltages have relationships that correspond to AND or OR logic functions.

**diode matrix**—1. A two-dimensional array of diodes used for a variety of purposes, such as decoding and read-only memory. 2. A hardware pattern in which diode leads may be inserted to change solid-state control logic.

**diode mixer**—A diode that mixes incoming radio-frequency and local-oscillator signals to produce an intermediate frequency.

**diode modulator**—A modulator in which one or more diodes are employed to combine a modulating signal with a carrier signal. It is used chiefly in low-level signaling because it has inherently poor efficiency.

**diode pack**—A combination of two or more diodes integrated into a solid block.

**diode peak detector**—A diode used in a circuit to indicate when audio peaks exceed a predetermined value.

**diode-pentode**—A vacuum tube having a diode and a pentode combined in the same envelope.

**diode rectification**—The conversion of an alternating current into a unidirectional current by means of a two-element device such as a crystal, vacuum tube, etc.

**diode switch**—A diode in which positive and negative biasing voltages (with respect to the cathode) are applied in succession to the anode in order to pass and block, respectively, other applied waveforms within certain voltage limits. In this way, the diode acts as a switch.

**diode-transistor logic**—Abbreviated DTL. 1. A logic circuit that uses diodes at the input to perform the electronic logic function that activates the circuit transistor output. In monolithic circuits, the DTL diodes are a positive-level logical AND function or a negative-level OR function. The output transistor acts as an inverter to result in the circuit becoming a positive NAND or a negative NOR function. 2. Any logic gate circuit that uses several diodes to perform the AND or OR function, followed by one or more transistors to add power to (and possibly invert) the output. Formerly very popular in digital systems, but now largely superseded by TTL circuits. 3. Logic employing diodes at the input with transistors used as amplifiers and resistor pull-up on the output.

**diode-triode**—A vacuum tube having a diode and triode combined in the same envelope.

**diopter**—1. The unit of optical measurement that expresses the refractive power of a lens or prism. 2. A measure of lens power equal to the reciprocal of the lens focal length in meters.

**dip**—1. A drop in the plate current of a class C amplifier as its tuned circuits are being adjusted to resonance. 2. The angle between the direction of the

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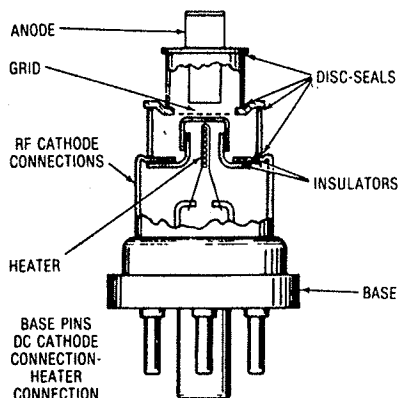


**light flux**—See luminous flux, 1.

**light guide**—1. An assembly of optical fibers and other optical elements mounted and finished in a component that is used to transmit light. 2. A conduit made up of fibers randomly collected or bunched in a group; it conducts light and images.

**light gun**—A photoelectric cell used by computer operators to take specific actions in assisting and directing computer operation. So called because of its gun-like case.

**lighthouse tube**—An ultrahigh-frequency electron tube shaped like a lighthouse and having disc-sealed planar elements. See also disc-seal tube.



*Lighthouse tube (cutaway view).*

**lighting outlet**—An outlet for direct connection of a lamp holder, lighting fixture, or pendant cord termination in a lamp holder.

**light intensity cutoff**—In a photoelectric alarm system, the percent reduction of light that initiates an alarm signal at the photoelectric receiver unit.

**light level**—The amount of (or intensity of) light falling upon a subject.

**light load**—A fraction of the total load the device is designed to handle.

**light meter**—An electron device that contains a photosensitive cell and calibrated meter for the measurement of light levels.

**light microsecond**—The unit for expressing electrical distance. It is the distance over which light travels in free space in 1 microsecond (i.e., about 983 feet, or 300 meters).

**light modulation**—Variation in the intensity of light, usually at audio frequencies, for communications or motion-picture sound purposes.

**light modulator**—The device for producing the sound track on a motion-picture film. It consists of a source of light, an appropriate optical system, and a means for varying the resulting light beam (such as a galvanometer or light valve).

**light negative**—Having a negative photoconductivity when subjected to light.

**lightning arrester**—A device to prevent damage to electrical equipment by transient overvoltages whether from lightning or switching. Spark gaps that can only be bridged by voltages above those used in the equipment allow the higher voltages to be discharged to ground.

**lightning generator**—A generator of high-voltage surge (e.g., for testing insulators).

## light flux — light source

**lightning rod**—A pointed metal rod carried above the highest point of a pole or building, and connected to earth by a heavy copper conductor, for the purpose of carrying a direct lightning discharge directly to earth without damage to the protected structure.

**lightning surge**—A transient disturbance in an electric circuit caused by lightning.

**lightning switch**—A switch for connecting a radio antenna to ground during electrical storms.

**light pen**—1. A light-sensitive device used with a computer-operated CRT display for selecting a portion of the display for action by the computer. 2. A photosensor placed in the end of a penlike probe. It is used in conjunction with a CRT display for drawing, erasing, or location characters. Operation is by comparison of the time it senses a light pulse to the scanning time of the display. 3. A hand-held data-entry device used only with refresh displays. It consists of an optical lens and photocell, with associated circuitry, mounted in a wand. Most light pens have a switch on the barrel that makes the pen sensitive to light from the screen. An activated light pen, when pointed at a vector or character on the screen, will generate an interrupt. It is then possible to identify the vector or character since the display stopped refreshing when the item was drawn that caused the interrupt. The most common uses of light pens are light-button selection and tracking.

**light pencil**—A narrow cone of light rays that diverges from a point source or converges to an image point.

**light pipe**—1. A bundle of transparent fibers that can transmit light around corners with small losses. Each fiber transmits a portion of the images through its length, reflection being caused by the lower refractive index of the surrounding material, usually air. 2. Transparent matter that usually is drawn into a cylindrical or conical shape through which light is channeled from one end to the other by total internal reflections. Optical fibers are examples of light pipes.

**light positive**—Having positive photoconductivity—i.e., increasing in conductivity when subjected to light.

**light-powered telephone**—Technology that relies on a highly efficient photodetector that can detect incoming light signals at one frequency and transmit outgoing signals at another, thus permitting the sending and receiving of light signals over one fiber with a single device.

**light ray**—1. A very thin beam of light. 2. A line, perpendicular to the wavefront of light waves, indicating their direction of travel and representing the light wave itself.

**light relay**—A photoelectric device that opens or closes a relay when the intensity of a light beam changes.

**light-sail**—A method of spacecraft propulsion using a giant sail to catch the solar wind, a nonfictional stream of ionized gas particles constantly emitted from the sun at speeds of up to 2 million miles an hour (3.2 million kilometers per hour).

**light sensitive**—Exhibiting a photoelectric effect when irradiated (e.g., photoelectric emission, photoconductivity, and photovoltaic action).

**light-sensitive Darlington amplifier**—Two stages of transistor amplification in one light-detector device. Darlington's give much higher gain than single transistors.

**light-sensitive tube**—A vacuum tube that changes its electrical characteristics with the amount of illumination.

**light source**—Any object capable of emitting light. (In fiber optics, the light source is normally either an LED or a laser.)



**CERTIFICATE OF SERVICE**

I declare that I am employed with the law firm of Morrison & Foerster LLP, whose address is 2000 Pennsylvania Avenue, NW Suite 6000, Washington, D.C. I am not a party to the within cause, and I am over the age of eighteen years.

I further declare that on June 19, 2017, I served true and correct copies of the following documents:

- **UBER TECHNOLOGIES, INC. AND OTTOMOTTO LLC'S PRELIMINARY CLAIM CONSTRUCTIONS UNDER PATENT L.R. 4-2**

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Leo P. Cunningham Wilson Sonsini Goodrich & Rosati 650 Page Mill Road Palo Alto, CA 94304-1050  <i>Attorneys for Plaintiff Waymo LLC</i>	<a href="mailto:lcunningham@wsgr.com">lcunningham@wsgr.com</a>

1 2 3 4 5 6 7	<p>I. Neel Chatterjee GOODWIN PROCTER LLP 135 Commonwealth Drive Menlo Park, CA94025</p> <p>Brett M. Schuman Rachel M. Walsh GOODWIN PROCTER LLP Three Embarcadero Center San Francisco, California 94111</p> <p><i>Attorneys for Defendant Otto Trucking LLC</i></p>	<p><a href="mailto:nchatterjee@goodwinlaw.com">nchatterjee@goodwinlaw.com</a>  <a href="mailto:bschuman@goodwinlaw.com">bschuman@goodwinlaw.com</a>  <a href="mailto:rwalsh@goodwinlaw.com">rwalsh@goodwinlaw.com</a></p>
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I declare under penalty of perjury that the foregoing is true and correct. Executed at Washington, D.C., this 19th day of June, 2017.

<p>Michelle Yang</p> <hr/> <p>(typed)</p>	<p>/s/ Michelle Yang</p> <hr/> <p>(signature)</p>
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